



**Bell & Howell<sup>®</sup>**

**AUTOLOAD<sup>®</sup>**

**8mm**

**MOVIE**

**CAMERA**

**MODEL 417**



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TO  
BELL & HOWELL  
OWNERSHIP

BELL & HOWELL • 7100 MCCORMICK ROAD • CHICAGO 45, ILLINOIS

OPEN THIS FLAP  
OF YOUR  
INSTRUCTION BOOKLET

Keep the flap open as you read through the instructions that follow. This will give you a quick reference to all the working parts of your Autoload Electric Eye camera. Familiarity with these names before operating your camera will assure complete success with your first roll of film.

5. SET FILTERS



When using Indoor, "Type A", films with natural, rather than artificial light, set the Filter Lever to "Type A". Use "Haze" all other times. Page 4.

6. FOCUS



Most of your movies will be taken with the lens set at the "Universal Focus Lock." However, focus for close-ups and critical sharpness. Pages 5 and 10.

7. SIGHT  
AND SHOOT



Sight through the viewfinder, compose your subject and press the starting button down. Press down further for exciting slow motion and up for single frame. Pages 4, 5, and 7.



POWERED ZOOM BUTTONS  
(PAGE 5)

FILM SPEED AND MANUAL  
CONTROL DIAL (PAGE 4-9)

RESERVE POWER  
INDICATOR (PAGE 2)

WINDING  
CRANK  
(PAGE 2)

STARTING BUTTON  
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FOOTAGE  
INDICATOR  
(PAGE 3)

CABLE RELEASE POSTS  
(PAGE 7)

COUPLED ZOOMATIC  
VIEWFINDER (PAGE 5)

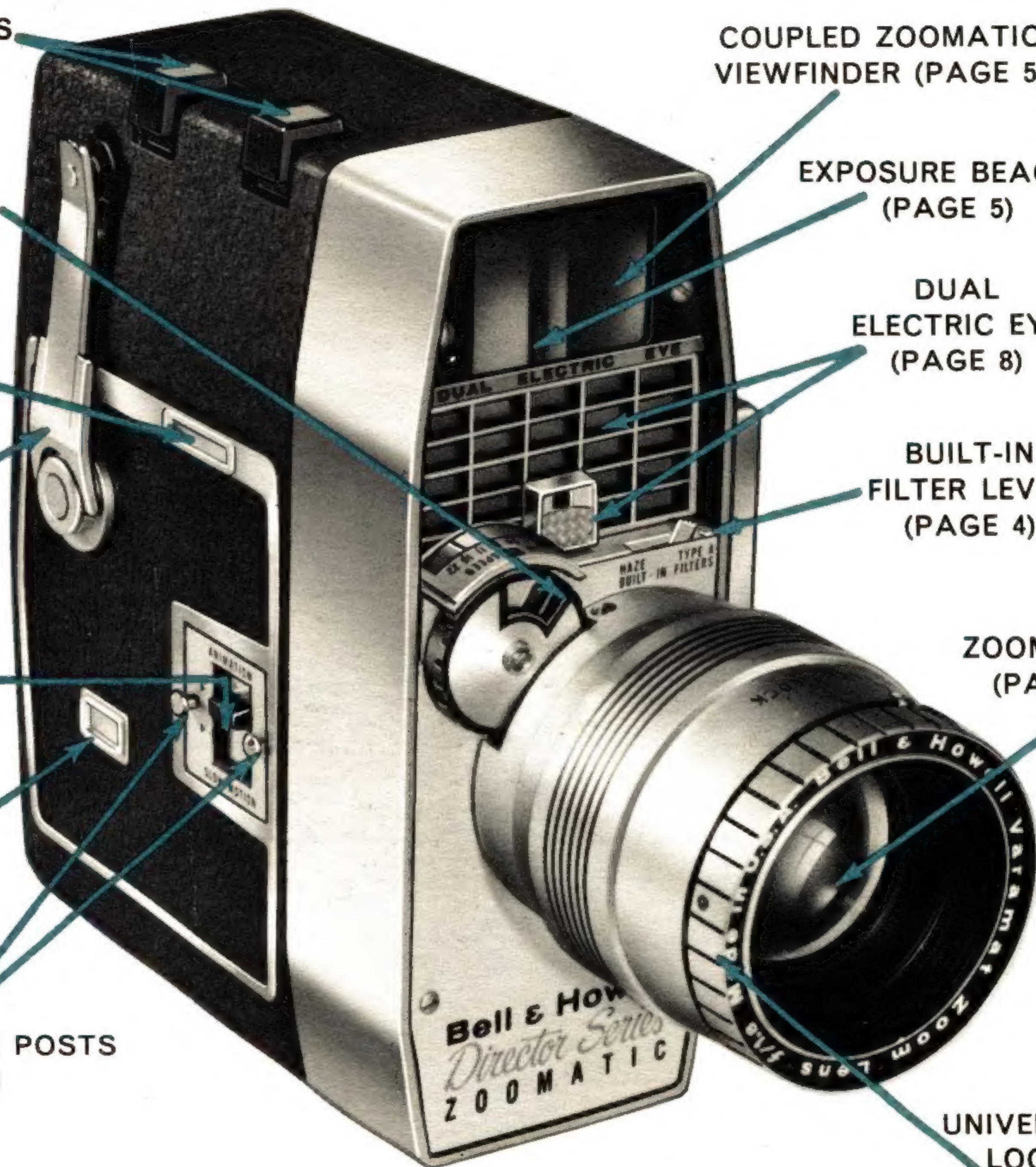
EXPOSURE BEACON  
(PAGE 5)

DUAL  
ELECTRIC EYE  
(PAGE 8)

BUILT-IN  
FILTER LEVER  
(PAGE 4)

ZOOMATIC LENS  
(PAGE 5-6-10)

UNIVERSAL FOCUS  
LOCK SLEEVE  
(PAGE 5-10)





Once you're familiar  
with your camera,  
use these  
easy steps

## 2. LOAD CARTRIDGE

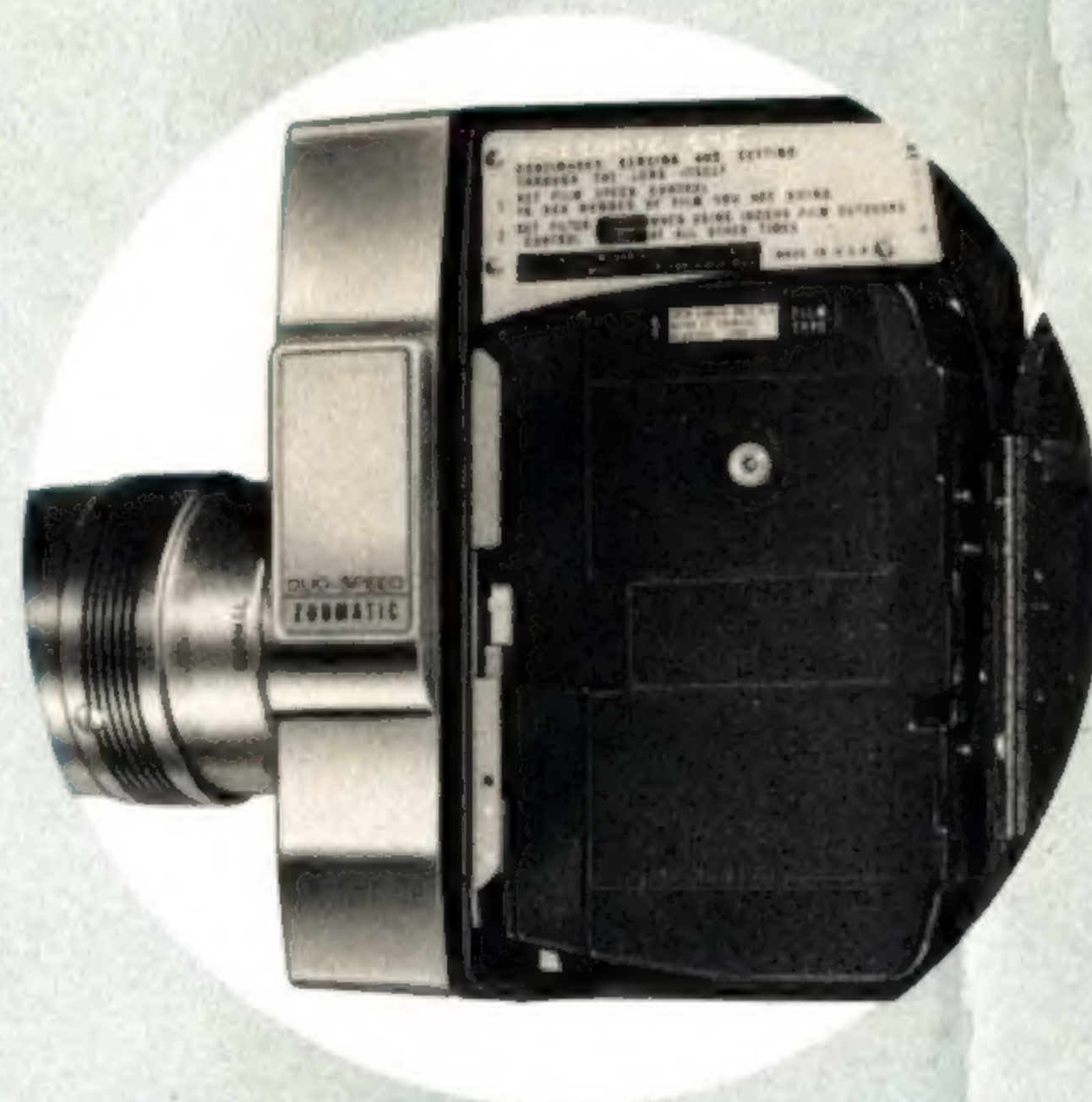


Load a standard 50' roll of 8mm movie film into cartridge. Fill in Film Information Label. Do not open until both sides are exposed. Pages 2, 3, & 6.

## 1. WIND

Fold the winding crank down and wind in a clockwise direction until the Reserve Power indicator reads "Full Wind." Page 2.

## 3. LOAD CAMERA



Slip the cartridge into the camera and you're ready to shoot. Film the second half by merely turning the cartridge over. Pages 2, 3 and 8.

## 4. SET ELECTRIC EYE



Set the A.S.A. Film Speed Dial to correspond with the type of film you are using. Be careful to use proper indoor or outdoor rating. Page 6.

## 5. SET FILTERS



When using Indoor, "Type A", films with natural, rather than artificial light, set the Filter Lever to "Type A". Use "Haze" all other times. Page 4.

## 6. FOCUS



Most of your movies will be taken with the lens set at the "Universal Focus Lock." However, focus for close-ups and critical sharpness. Pages 5 and 10.

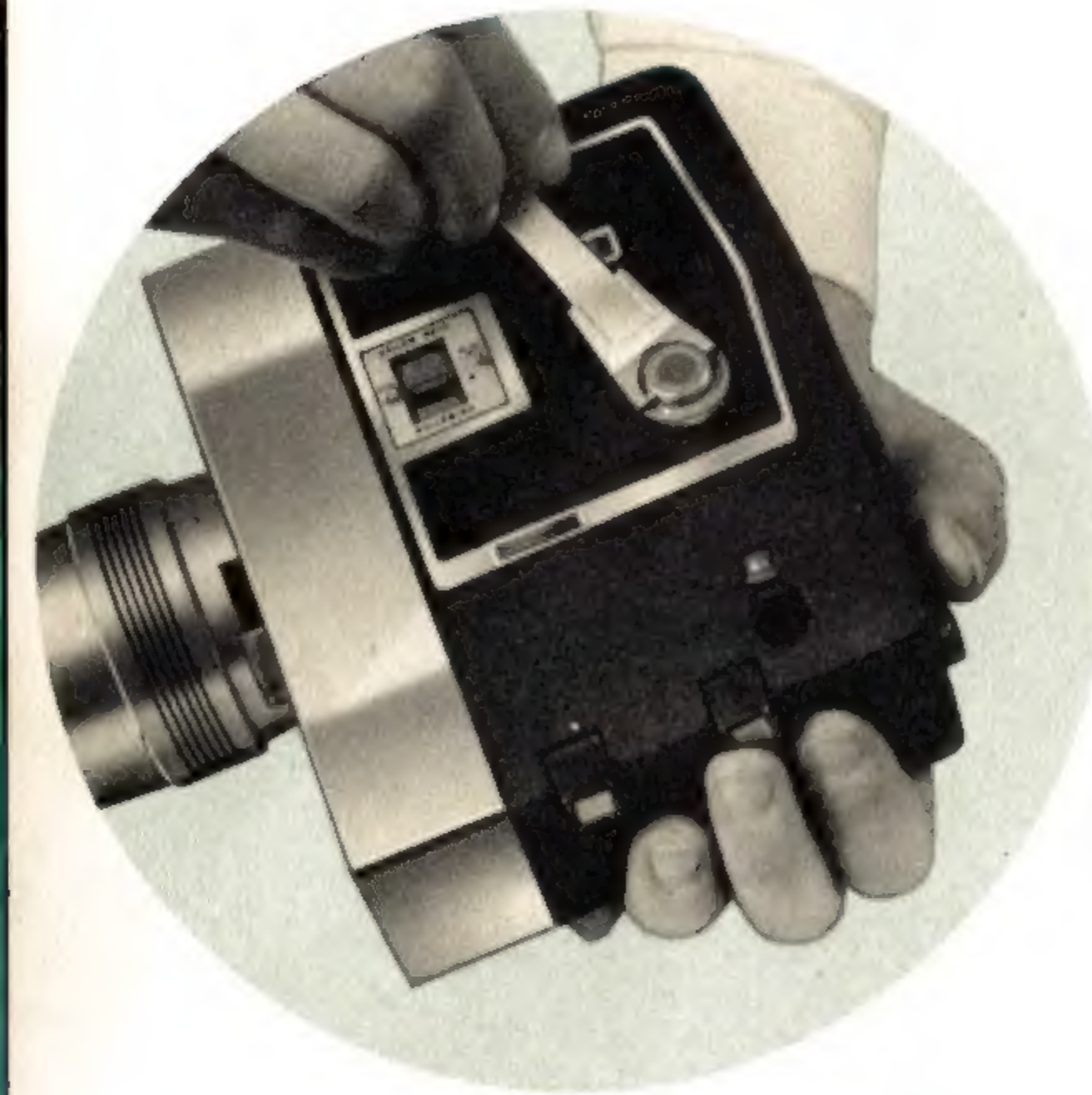
## 7. SIGHT AND SHOOT



Sight through the viewfinder, compose your subject and press the starting button down. Press down further for exciting slow motion and up for single frame. Pages 4, 5, and 7.



## WINDING



Fold the Winding Crank down. Wind in a *clockwise* direction until the Reserve Power indicator reads "Full Wind" and is completely "red". (Your camera cannot be overwound.) When you shoot and the red disappears, it's time to wind again. So you don't miss an important scene, wind after each exposure. After winding, snap the crank back in place. Never depress the Power Zoom buttons when winding your camera.

## FILM



Because of the difference between outdoor and artificial, indoor lighting, you'll use various films in your Autoload camera. These films have different film speed ratings and the camera must be set accordingly as described on Page 4.

## LOADING FILM



Open the camera door by pushing the latch down. Remove the cartridge. "Open Here" arrow, indicates where cartridge can be opened. Just raise cover using finger detent. Place the cartridge as illustrated. Avoid bright light, unwind 4" of film keeping it taut on the spool by grasping the film on the spool. Drop the full spool of film onto the white spindle. The side of the spool with four notches should be up.



Place the film around the white guide bar and then in front of the film pressure plate as illustrated (light side of film forward). Continue threading around the other end of the guide bar and insert the film, following the arrow, into the film core. The film, properly inserted in the core, extends about  $\frac{1}{16}$ " above the core and is loose around the core. Close the cover, and do not reopen until both sides have been completely exposed.

## AUTOMATIC FOOTAGE INDICATOR



The Film Footage Indicator on your Electric Eye Autoload camera is automatically set when you load. Press the starting button down and run the camera until the indicator reads "0". This will run off the protective leader film. *Do not* open camera door again until you are ready to turn the cartridge over.

With pencil, write the ASA Speed on the film information labels on both sides 1 and 2. This is erasable, but will appear in the camera door window when loaded in the camera.

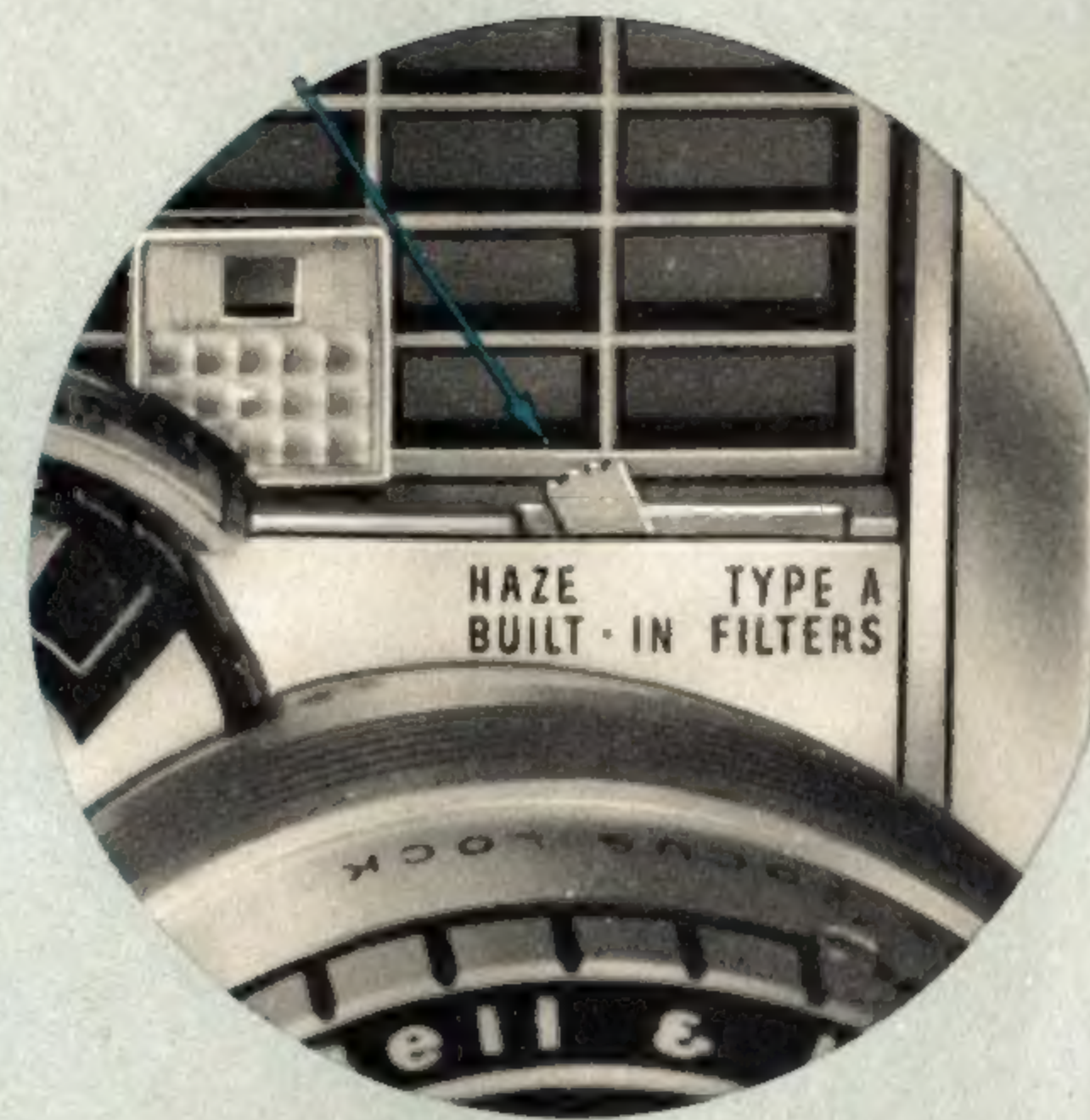
Note that "0" appears in the cartridge nameplate window where "Number Shows Side Exposed" is printed. This information is useful for storing loaded cartridges. Insert the cartridge in the camera with Side 1 up. Close the camera door and lock by pushing lock up. Important: Do not reopen camera door until Side 1 has been completely exposed.



## SET FILM SPEED



Your camera has a graduated scale with film speed settings from 10 to 40. To set the Dual Electric Eye for the correct film speed, turn the dial until the correct film speed appears in the window (Arrow). You will find the recommended film speed on the instruction sheet packaged with the film. The indoor film speed rating is usually different than the outdoor rating. Be sure to set the Dual Electric Eye at the correct speed.



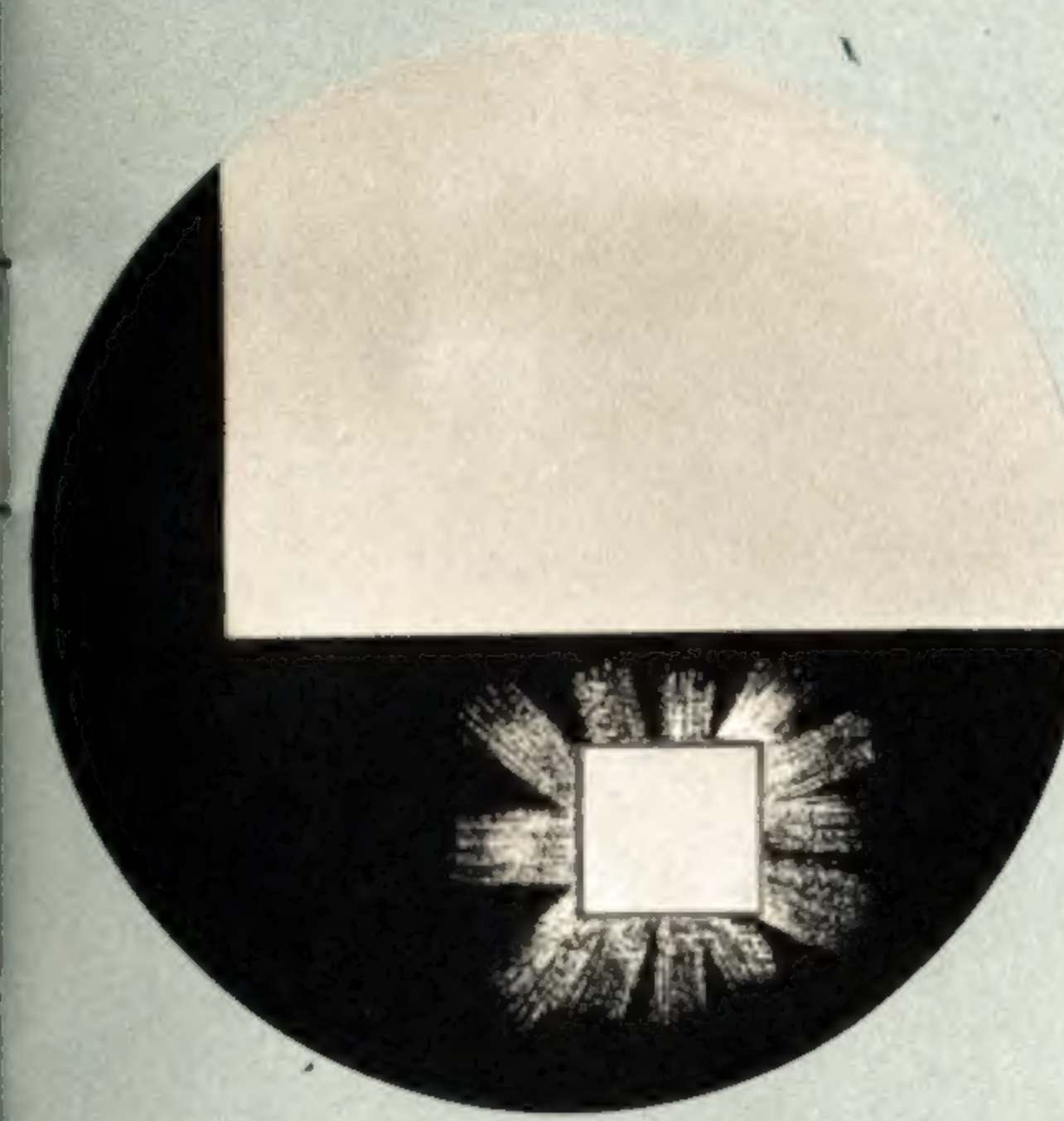
**HAZE FILTER** The optical system of your camera automatically provides haze filtering for landscape, snow scenes and panoramic views even on cloudy hazy days. This exclusive feature eliminates the need for an accessory haze filter.

Set the Filter Lever to the "Haze" position. This is the position you'll use most of the time, whether you're filming indoors or out.

**TYPE A FILTER** For convenience, you may occasionally want to use Type A (indoor) film outdoors. To do this, merely set the Filter Lever to the "Type A" position and change the film speed setting. Remember to reset your camera when you move back indoors.



## EXPOSURE BEACON AND ZOOM INDICATOR



Point your camera toward and away from the light and watch the Exposure Beacon in the bottom of the view-finder. When there's enough light, the beacon shows "yellow" and your movies will always be properly exposed. If the beacon turns "red" there's not enough light for filming. If "black" your camera is set for manual operation.

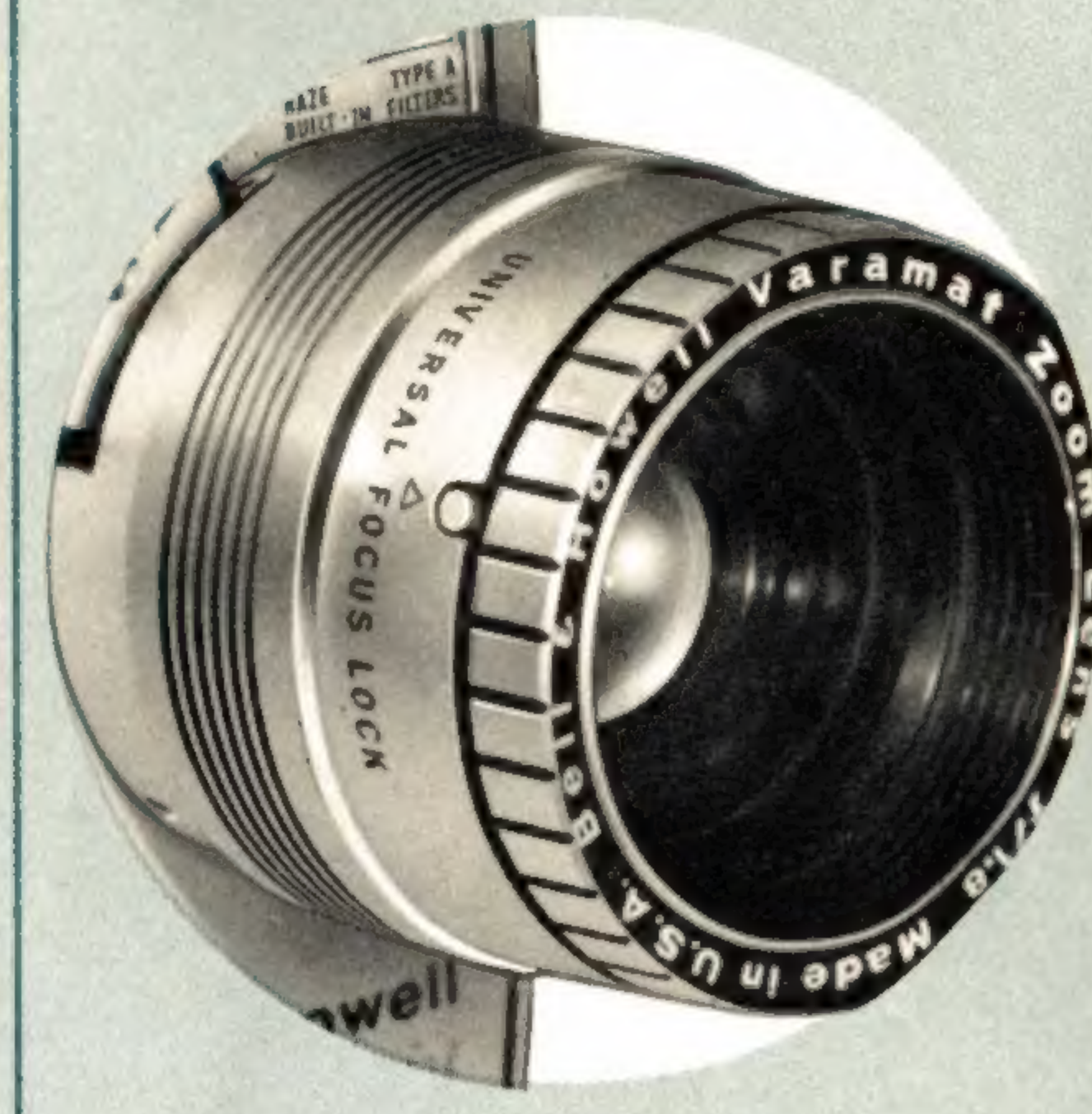
## ZOOM LENS AND VIEWFINDER



Without moving a step, you can create dramatic powered zoom effects. Just press the front button when you want to zoom in closer to your subject. Press rear button when you want to zoom farther away. Your Zoomatic lens can also be preset at various settings as described on the next page.

**NOTE:** Power Zooming can only be accomplished when the camera is wound and the starting button (Page 7) is depressed. For best zoom results, see tips on zooming, Page 11.

## UNIVERSAL FOCUS LOCK



The Universal Focus Lock is a built-in convenience you will probably use for most of your filming. When shooting outdoors on a sunny or slightly overcast day, this setting gives a maximum focus range in front of and behind your subject. When you are filming fast action, or unpredictable scenes, this setting will give you sharp movies. When shooting close-ups or telephoto shots where the scene is dimly lit, the focus range is greatly reduced. For these scenes, set the lens at the exact distance of your subject as described on page 10.



## FILM COMMENTS

Eight mm movies are actually taken on movie film that is 16mm wide, and 25 feet long (useable footage). This film is then slit in processing and spliced end for end to give you a 50' roll of movies. To conform with ASA standards "leader" and "trailer" footage is also provided. This leader and trailer is used in processing, cut off, and discarded. For proper operation, only films that conform to these ASA standards should be used in your camera.

Also, be sure that the film you purchase is actually tucked into the slot on the supply spool. Film that is merely wrapped around the spool, or cinched, will not take up properly on the second half of the film.

## ZOOM LENS



WIDE ANGLE

Use this position for filming indoors in close quarters, where you want to include more in your picture. This position is also desirable for outdoor scenic shots.



NORMAL

This is the lens position you'll probably use most of the time. Follow the action of your vacations and holidays, sports, hobbies and special events.

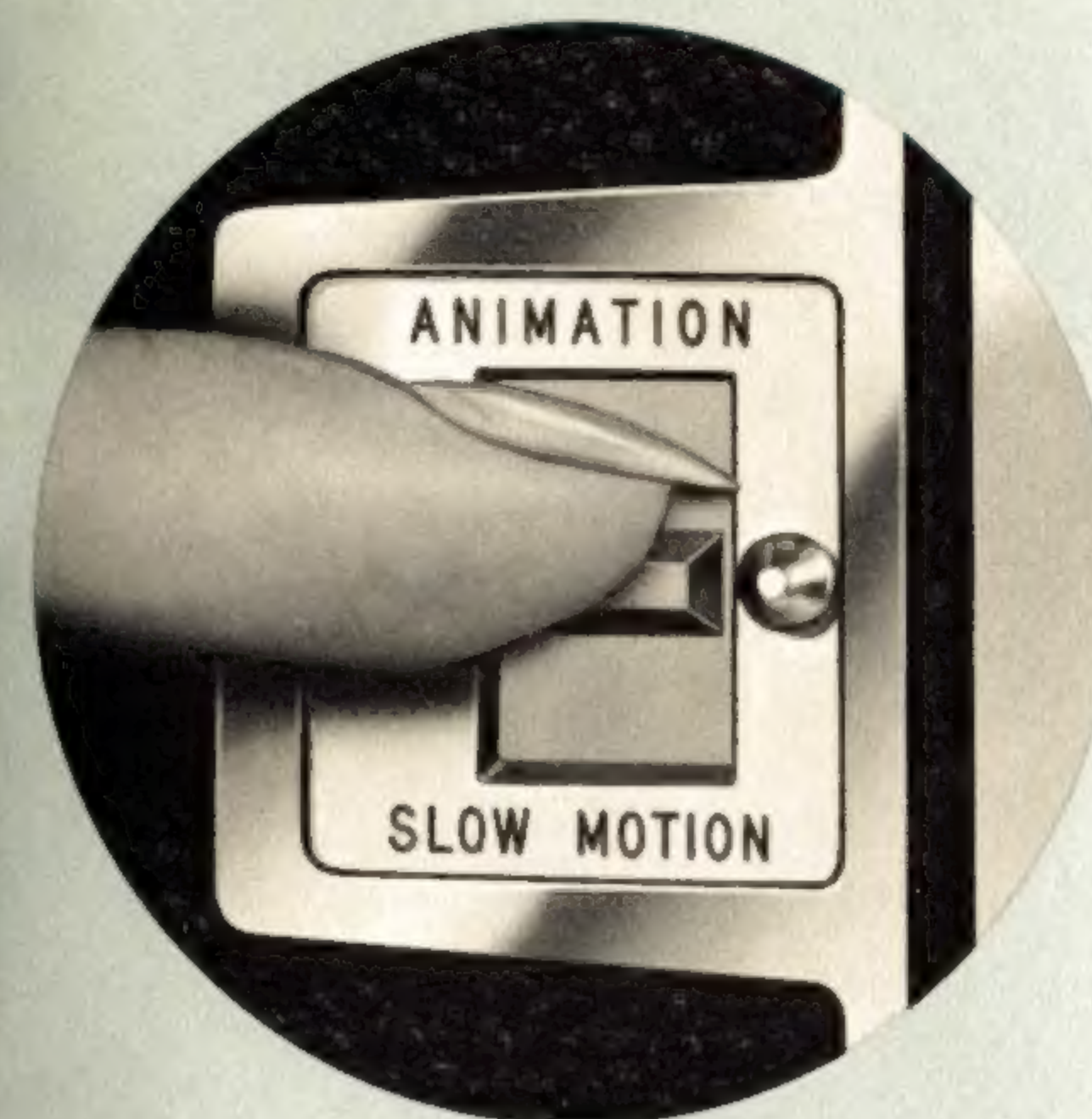


TELEPHOTO

This position will magnify your subject, making it extremely useful when you want to film close-ups from a distance, candid, and enlarged views of distant objects.

## 3-WAY STARTING BUTTON

### 1. RUN

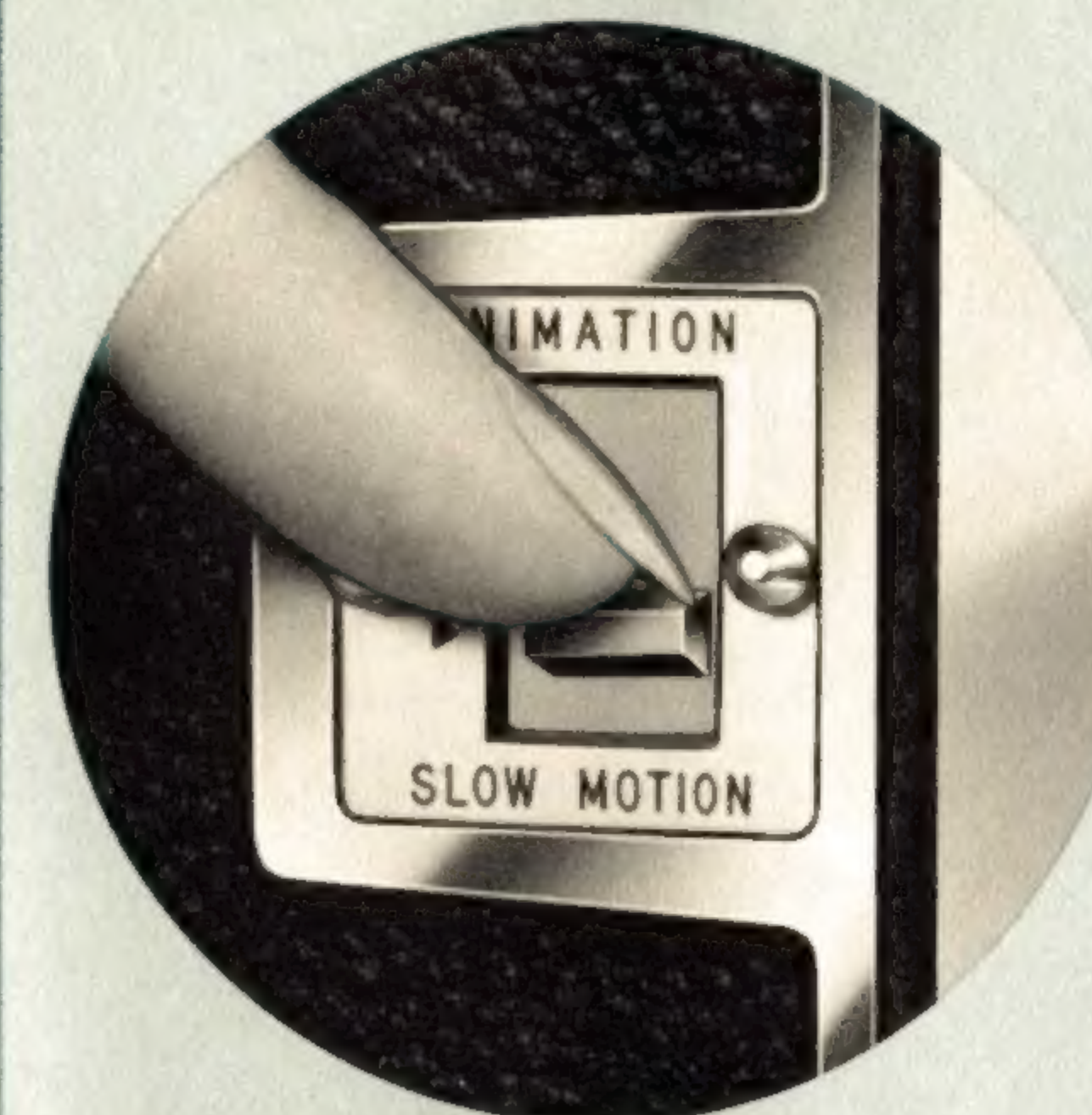


Press downward slightly to "RUN" position, and film moves through your camera at normal speed. If your camera has been fully wound, you can expose 15 feet of film, enough for 8 or 9 average length scenes.

Note: When you press the Starting Button or release it, avoid moving the camera. Such movement will be exaggerated when the film is projected on your screen.

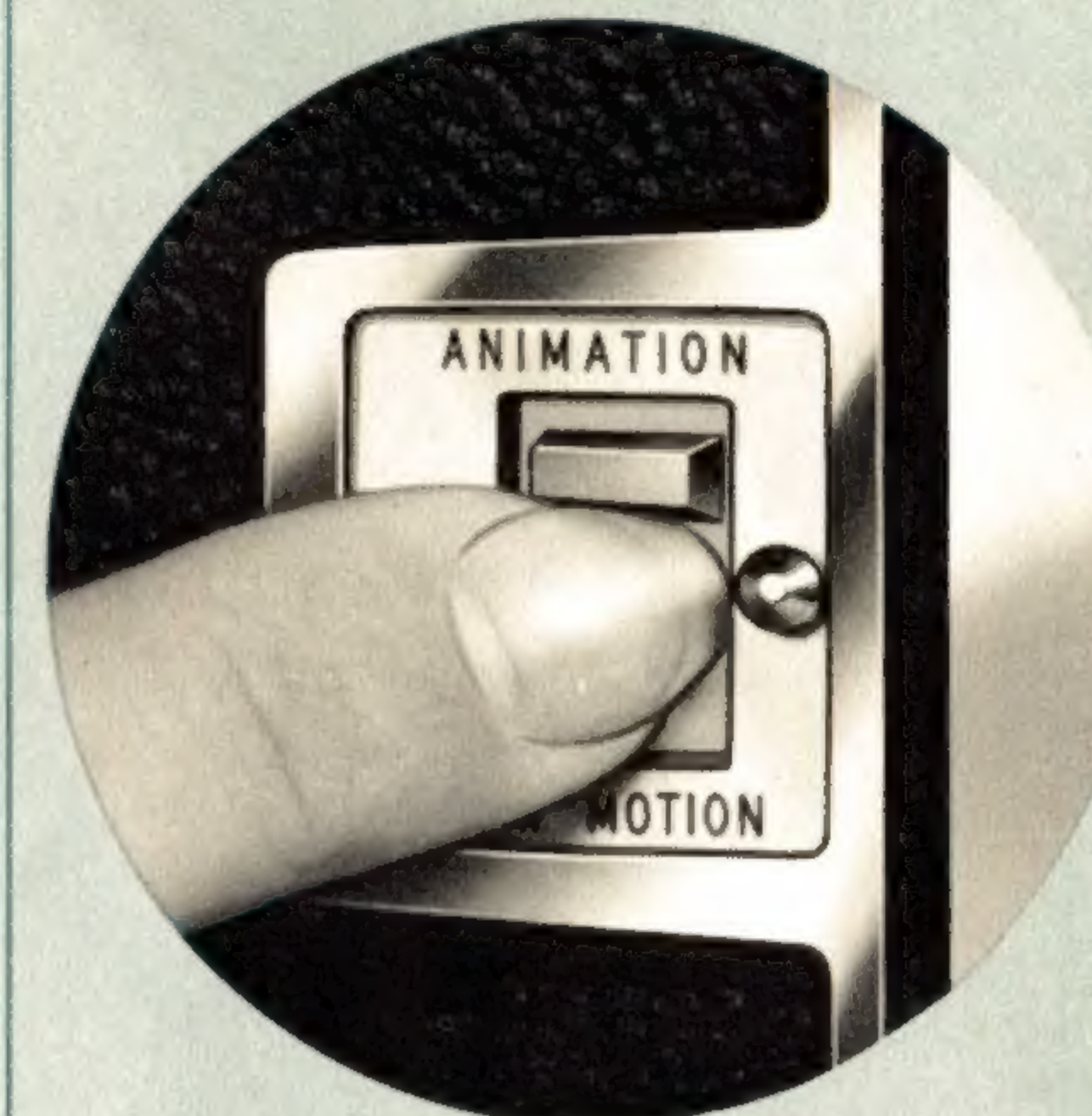
The Cable Release Posts permit the installation of the accessory "Cable Release Adapter."

### 2. SLOW MOTION



Press all the way down for slow motion movies. (For properly exposed slow motion movies, the starting button must be depressed completely.) Use this faster sounding speed to take slow motion studies of your golf swing, Junior running down the football field, or Susie diving. You can switch from normal speed to slow motion and back again, without ever taking your finger off the Starting Button. Make sure there's enough light for slow motion movies. See automatic operation page 8.

### 3. ANIMATION



Press upward to "ANIMATION" position, and a single frame is exposed. A number of single frame shots are necessary to make an adequate animation scene and can give you many unusual effects: For example, if you move a toy very slightly between each frame, it will appear to move when you project the scene. Similarly you can capture the beauty of a sunset, produce some tricky titles, or watch the opening of your prize rose with some time lapse shots. For best animation results, you'll want to use a tripod.



## FULLY AUTOMATIC ELECTRIC EYE OPERATION



If there's enough light to take movies, the Dual Electric Eye will set your lens automatically. The needle will stop at any lens opening from 1.8 to 22, and is useful when using depth of field information described later. It is also useful when taking slow motion movies.

**NOTE:** If the red needle is in the black area of the scale when you point camera at subject, there's not enough light for slow motion movies.

## UNLOADING



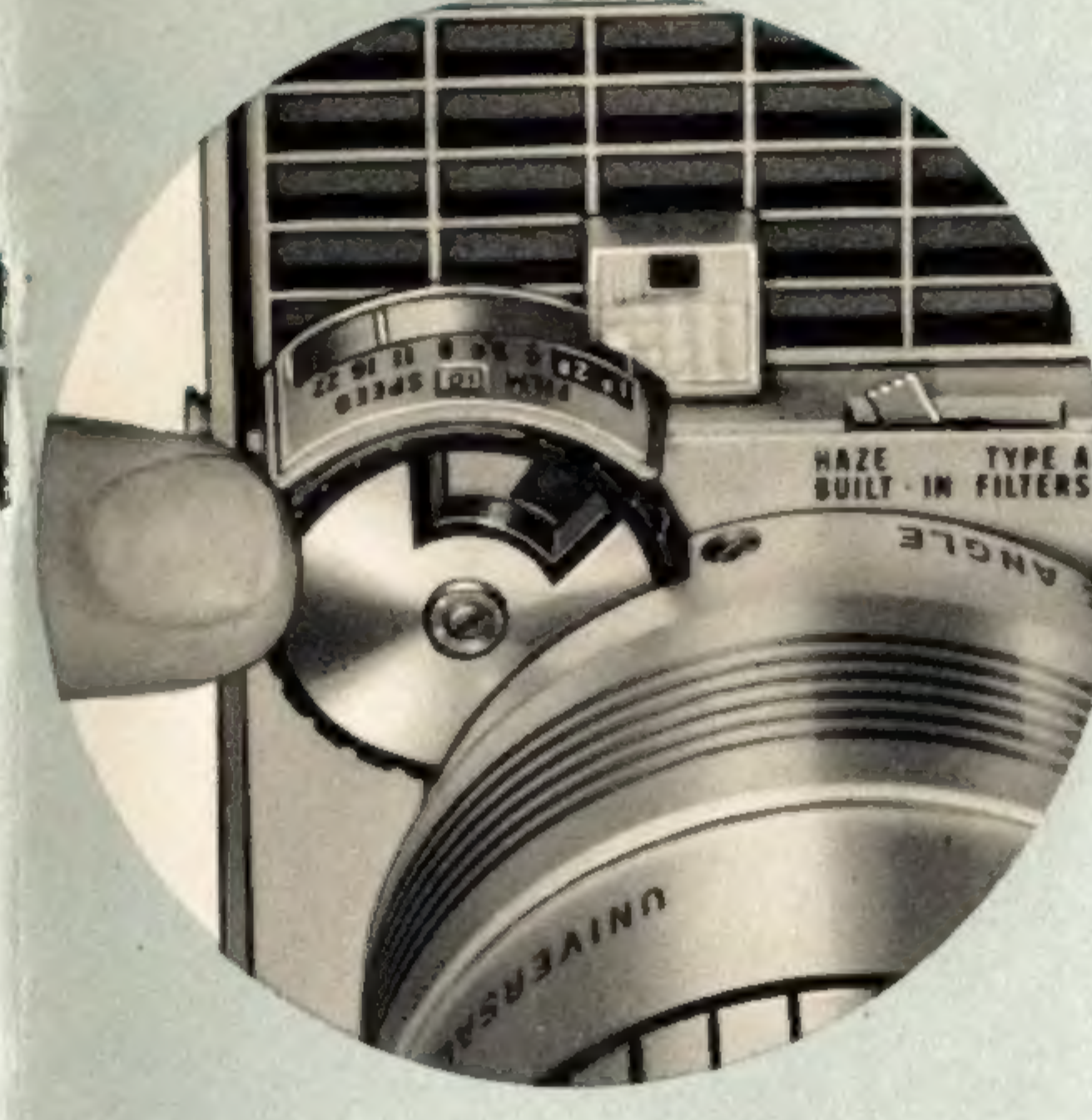
After you have exposed the first 25 feet of film as shown on the Footage Counter, wind the camera, and run until it stops. The automatic stop in the cartridge will stop the camera with the Footage Counter at "End". Open the camera door and remove the cartridge. Absolutely, do not open the cartridge. Note that "1" appears in the Side Exposed Window.

## USING SECOND HALF OF FILM



To run the second 25 feet of film, merely turn the cartridge over and insert in the camera with Side 2 up. Repeat the instructions for Side 1. Do not open the camera door until Side 2 is completely exposed. After you have exposed Side 2 and run the camera until it has stopped on "End," remove the cartridge. The number "2" appears in the Side Exposed Window, indicating that both sides have been exposed and the film is ready for processing. Remove the film from the cartridge. The cartridge should not have been opened prior to this time.

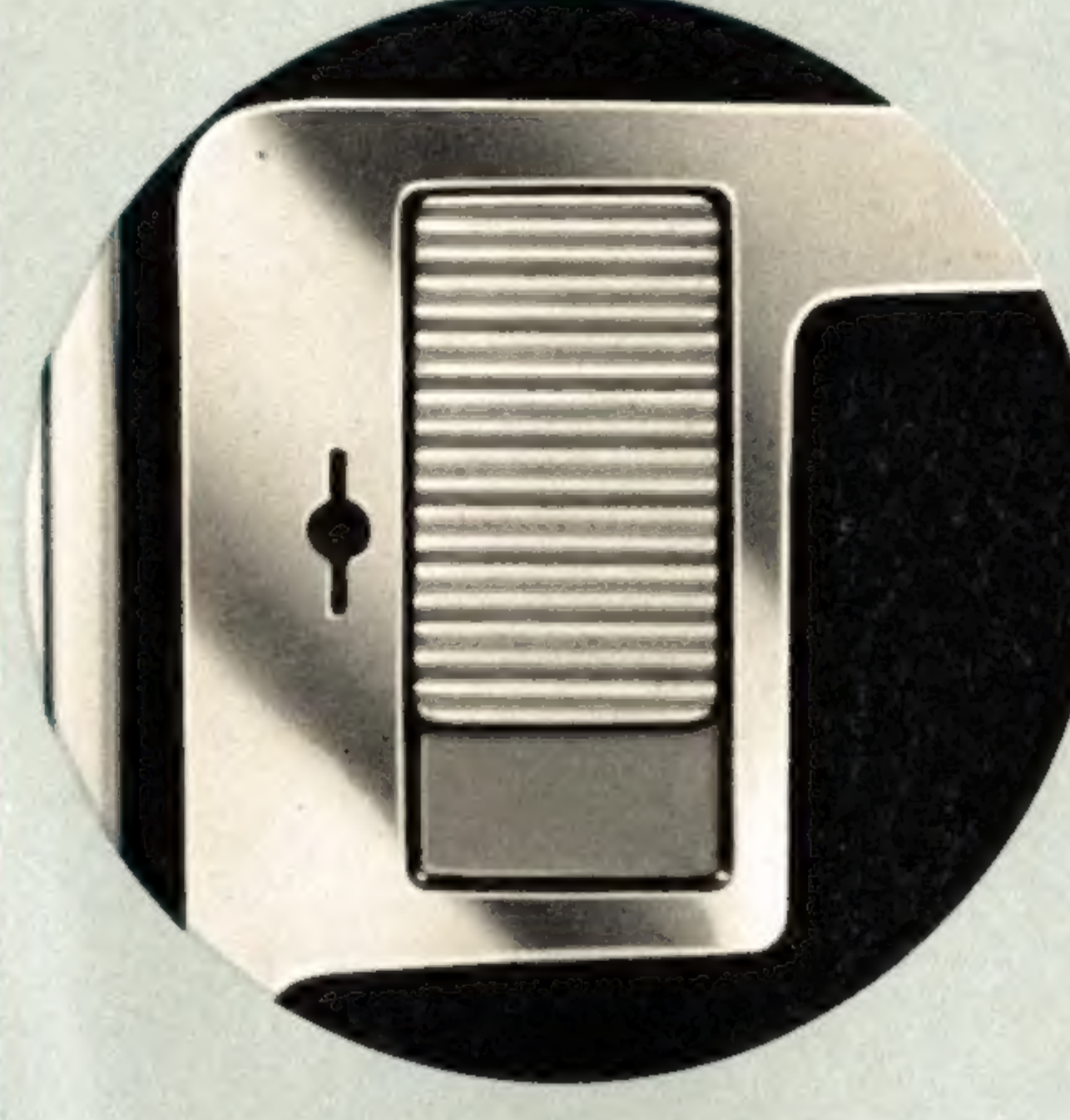
## MANUAL OPERATION



Turn the Film Speed Dial past "M" in the direction of the arrow, and watch the red exposure needle move. Turn the dial to set the needle at the lens opening you choose. (1.8, 2.8, 4, 5.6, 8, 11, 16.) By setting your lens manually, you can get special exposure effects as described on page 13.

**Note:** Set the red needle  $1\frac{1}{2}$  f/stops toward lower numbers when shooting slow motion movies.

## FILM PLANE REFERENCE MARK



The small circle broken by the straight line next to the door latch, shows the actual film plane inside your camera. This reference point is valuable when you're shooting titles, close-ups, etc., as it lets you measure the exact distance from film to subject. It is also useful when you make distance settings by scale as described on the next page.

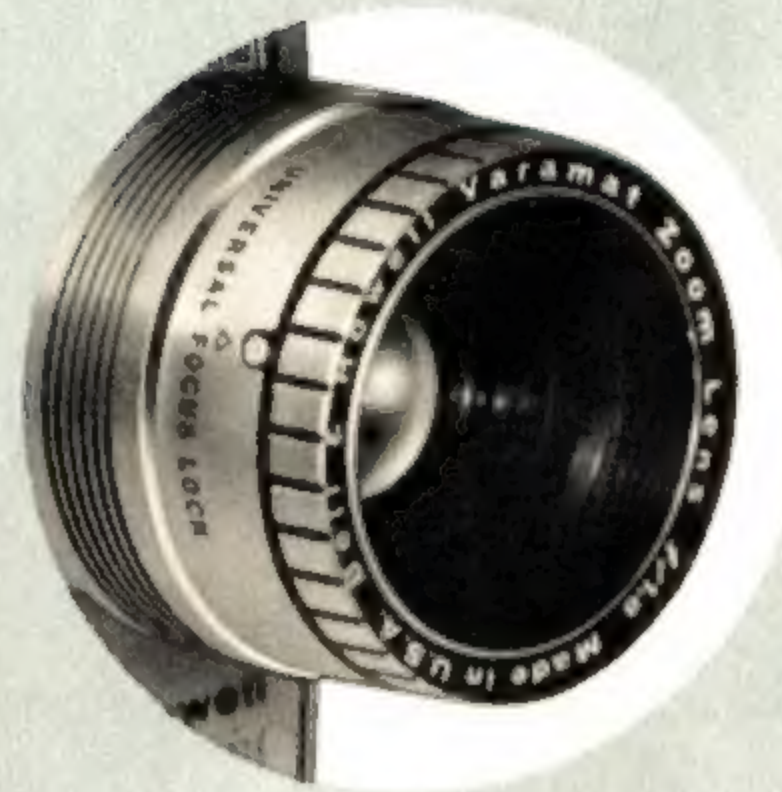
## PLAN YOUR MOVIES



Hold your camera steady and level before you press the Starting Button. Try to plan your movies so they'll tell a story with continuity and interest. Shoot each scene for at least 7 seconds, taking a series of pictures with relationship between them. Now that you are familiar with your Dual Electric Eye camera, you can take thrilling automatic movies you'll always be proud to show.



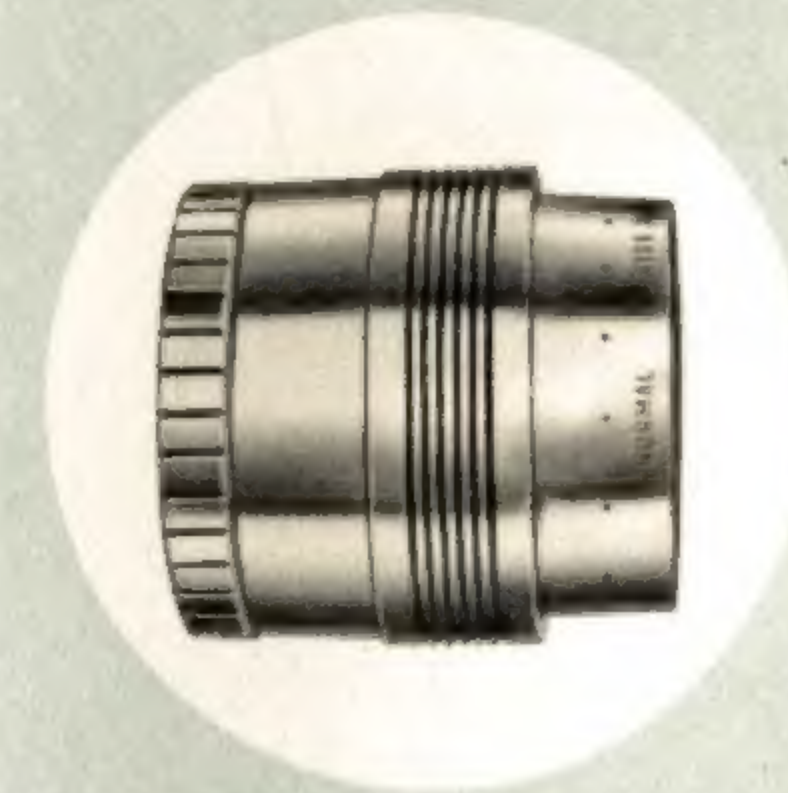
## DISTANCE SETTINGS BY SCALE



When you want to set your Zoomatic lens accurately on a given distance, (especially advantageous when in telephoto) push the sleeve covering the distance scale back. After the sleeve has been pushed back, the lens may be set at any distance shown on the distance scale. Turn the front of the lens until the distance setting you want to use is opposite the small triangle index mark on the lens sleeve. The distance scale is marked with settings from 6 feet to infinity. The illustration (below) shows the lens set at 20 feet.



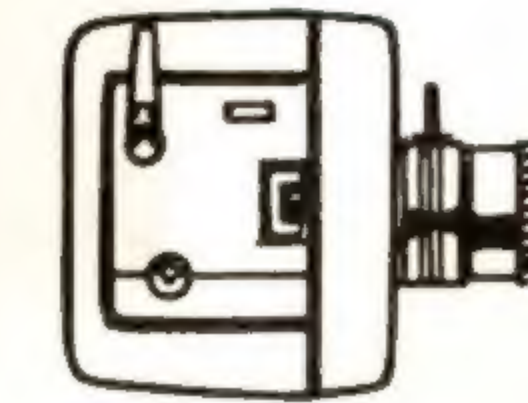
To reset the lens at the Universal Focus Lock position, merely turn the lens to 20 feet so the sleeve can be pulled forward *as far as it will go* until it covers the distance scale.



## DEPTH OF FIELD WITH YOUR ZOOMATIC LENS

Depth of field as illustrated on the following page, refers to the points nearest to and farthest from the lens at which you will get clear, sharp movies. It is governed by the size of the lens opening, the distance at which the lens is set, and the wide angle-normal-telephoto position. If you want to take full advantage of lens depth of field, familiarize yourself with the depth of field tables on the pages that follow. These tables show you the nearest and farthest points of sharpness for different combinations of lens settings described above.

## DEPTH OF FIELD ... EXAMPLE



ZOOMATIC LENS  
SET AT NORMAL  
POSITION. DISTANCE  
SCALE SET AT 6 FT.  
LENS OPENING 1.8

NEAR LIMIT 4'4"

DEPTH OF FIELD 5'5"

FAR LIMIT 9'9"

OBJECT  
FOCUSED ON

1' 2' 3' 4' 5' 6' 7' 8' 9' 10' 11' 12'

## TIPS ON ZOOMING

1. For wide angle and normal movies, your camera can be held in the hand. For telephoto shots, or zoom movies, a steady support; even a camera tripod, is recommended. This incidentally, is a good practice for all movie making.
2. Don't zoom too much. Like any good technique, it will be most effective when used sparingly.
3. When using various lens positions, consult the depth of field tables. These tables show the near and far limits of sharpness at various lens openings and distance settings. Note: This range of sharpness decreases as you zoom to the telephoto position. Therefore, it is best to start your zoom effect with the lens set at the wide angle position.
4. When you use a specific distance setting on your lens, it is not necessary to change this setting when you zoom. However, if you switch to a new subject at a different distance, the scale must be set for the new distance.

## SHOOTING TITLES AND CLOSE-UPS

When shooting titles and close-ups, allowance must be made for the fact that the viewfinder is  $2\frac{3}{4}$  inches above the zoom lens. For all subjects ten feet or more from the camera this can be ignored. At distances of less than ten feet, however, you should compensate as follows:

Look through the viewfinder and frame the subject. Then, physically move the camera  $2\frac{3}{4}$  inches upward and  $\frac{1}{4}$  inch to the right (when facing rear of camera). Check the table on the following pages.



## TIPS ON MOVIE MAKING

1. Most 50 ft. rolls of 8mm film have extra footage as leader. Because of the design of the cartridge, some of this leader film can now be used. Thus you can actually start shooting scenes before the Footage Indicator reads "0" and after it reads 25 ft. However, do not take highly valued scenes on this portion as film processors cut off different amounts of leader in the developing process.
2. As you probably already know, the first principle of good photography is—"keep the sun over your shoulder"—unless you are shooting for special effects. Direct light from the sun can cause unpleasant glare.
3. When shooting close-ups at a distance of 6 feet, the range of sharpness is greatly reduced with any lens. At this distance, you will want to use your distance scale, especially when shooting in telephoto position. As shown in the depth of field illustration on page 11, your background will not be as sharp as your subject. For this reason, the best closeups are obtained with a plain background (such as open sky, sand, water), which does not detract from the subject.
4. When you shoot indoors with a lightbar, there are several things you should remember: (a) Make sure your camera is loaded with indoor film and set at proper film speed. (b) Always keep your subject further from the camera than it is from the background. This will give you good over-all exposure as your subject and background will be lighted at approximately the same level. When taking indoor movies, the exposure beacon will frequently show red, indicating insufficient light. However, if your subject is within 10 feet to 12 feet of your camera and light source, your movies will be correctly exposed.
5. When it is necessary to "pan"—that is to revolve the camera horizontally while the scene is being shot, there are several things you should remember: (a) When panning to follow a moving subject, keep it centered in the viewfinder. (b) As a rule, you'll get best results if you pan from left to right. (c) Never pan on close-ups—you'll get a blur. (d) Pan only when absolutely necessary; hold camera steadily.

Any additional questions you have on movie making can be answered by your Bell & Howell dealer. He is an expert in photography.

Before you take movies of that special occasion, *take a roll of practice film* with your Autoload Dual Electric Eye camera. This will give you an opportunity to familiarize yourself with camera operation and a chance to check your results. Listed below are a number of tips and suggestions for better movies with your camera.

## EXPOSURE EFFECTS

Ordinarily you'll get the most natural color and brilliant detail in your movies if you avoid scenes in which the sun is directly behind your subject. Back-lighted scenes (examples: sun shining behind your subject or a bright sky behind a shoreline heavy with trees) can give you interesting silhouette effects. In back-lighted scenes, the subject will appear dark against a bright background. If you wish to capture the color detail of a dark subject in a bright scene, the lens must be opened one or more stops. This is done by pointing the camera (set in Auto position) at the scene from about 1' away, noting the setting of the red needle. Then set lens manually to this opening. Example: If the red needle showed a lens setting of f/5.6 at 1' away in the Auto position, set the red needle manually to f/5.6. If the red needle showed a lens setting between f/5.6 and f/4 set the red needle manually between f/5.6 and f/4.

Try this a few times with difficult scenes until you get the effect you want. Sometimes you may want a dark foreground against a blue sky—then set the red needle manually to the light reading for the background rather than the subject.

### EXPOSURE DATA

| STARTING BUTTON POSITION | CAMERA SPEED         | SHUTTER SPEED |
|--------------------------|----------------------|---------------|
| RUN                      | 16 FRAMES PER SECOND | 1/35 SECOND   |
| SLOW MOTION              | 48 FRAMES PER SECOND | 1/100 SECOND  |
| ANIMATION                | SINGLE FRAME         | 1/35 SECOND   |

## KEEP YOUR CAMERA CLEAN

Whenever necessary, wipe off the lens, viewfinder, and film channel with a piece of lens tissue moistened with Bell & Howell Opti-Kleen. Clean the film channel thoroughly. Have your camera checked and cleaned periodically, and before any important event, by Bell & Howell, or an approved Bell & Howell Service Station.



# DEPTH OF FIELD — 9mm WIDE ANGLE

| Lens Opening                         |      | 1.8     | 2       | 2.8     | 4       | 5.6     | 8       | 11      | 16      | 22      |
|--------------------------------------|------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Object Distance                      |      |         |         |         |         |         |         |         |         |         |
| 50 ft.                               | NEAR | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       |
|                                      | FAR  | 6'      | 5'8"    | 4'2"    | 3'1"    | 2'3"    | 1'7"    | 1'2"    | 10"     | 8"      |
| 25 ft.                               | NEAR | TO INF. | TO INF. | TO INF. | TO INF. | TO INF. | TO INF. | TO INF. | TO INF. | TO INF. |
|                                      | FAR  | ↓       | ↓       | ↓       | ↓       | ↓       | ↓       | ↓       | ↓       | ↓       |
| UNIVERSAL<br>20 ft.<br>FOCUS SETTING | NEAR | 5'5"    | 5'2"    | 4'      | 3'      | 2'2"    | 1'7"    | 1'2"    | 10"     | 7"      |
|                                      | FAR  | INF.    | INF.    | INF.    | INF.    | INF.    | INF.    | INF.    | INF.    | INF.    |
| 15 ft.                               | NEAR | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       |
|                                      | FAR  | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       |
| 14 ft.                               | NEAR | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       |
|                                      | FAR  | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       |
| 13 ft.                               | NEAR | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       |
|                                      | FAR  | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       |
| 12 ft.                               | NEAR | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       |
|                                      | FAR  | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       |
| 11 ft.                               | NEAR | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       |
|                                      | FAR  | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       |
| 10 ft.                               | NEAR | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       |
|                                      | FAR  | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       |
| 9 ft.                                | NEAR | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       |
|                                      | FAR  | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       |
| 8 ft.                                | NEAR | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       |
|                                      | FAR  | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       |
| 7 ft.                                | NEAR | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       |
|                                      | FAR  | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       |
| 6 ft.                                | NEAR | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       |
|                                      | FAR  | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       |

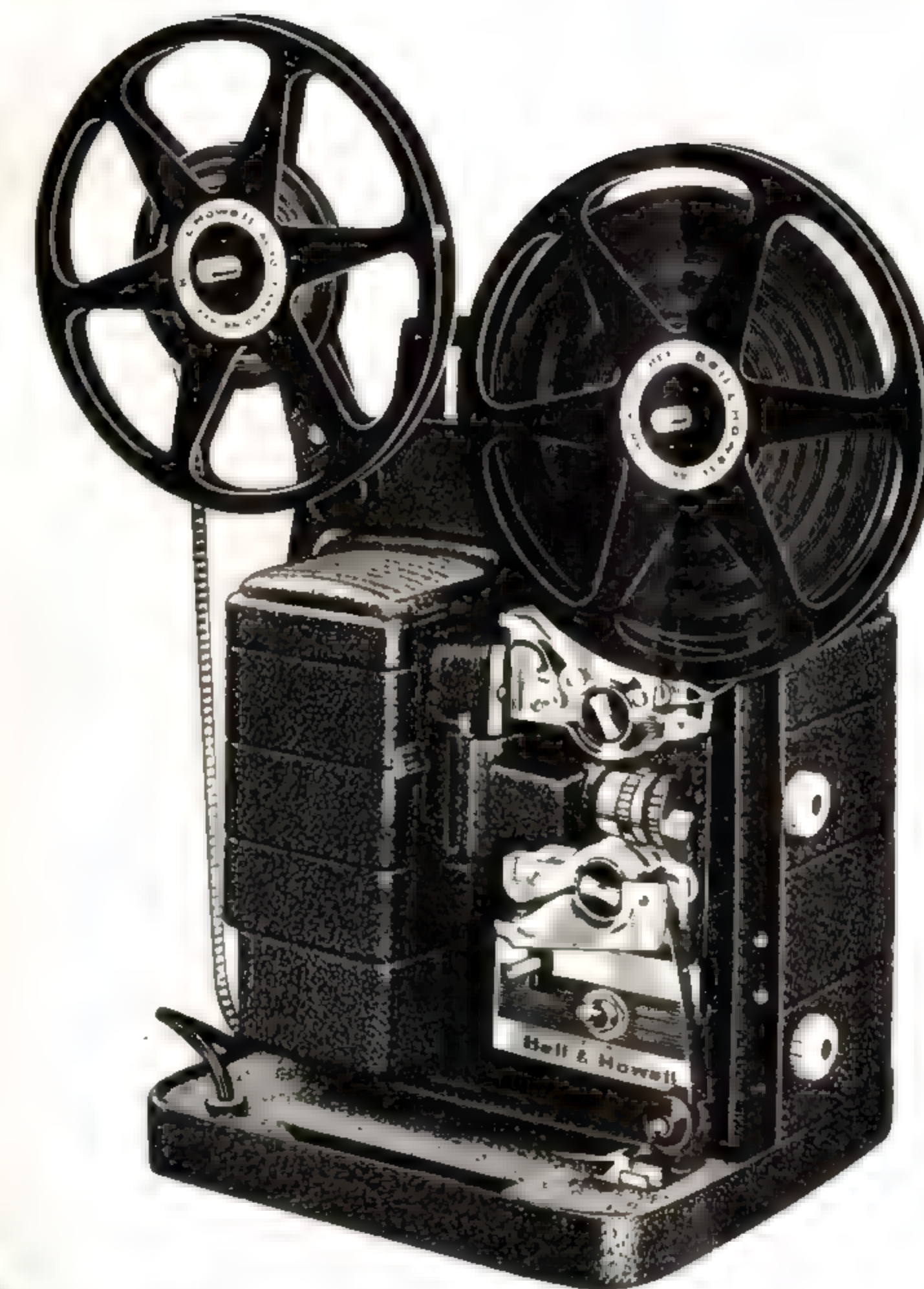
# DEPTH OF FIELD — 13mm NORMAL

| Lens Opening                         |      | 1.8   | 2     | 2.8   | 4       | 5.6     | 8       | 11      | 16      | 22      |
|--------------------------------------|------|-------|-------|-------|---------|---------|---------|---------|---------|---------|
| Object Distance                      |      |       |       |       |         |         |         |         |         |         |
| 50 ft.                               | NEAR | 12'   | 11'   | 8'8"  | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       |
|                                      | FAR  | Inf.  | Inf.  | Inf.  | 6'      | 4'3"    | 3'2"    | 2'5"    | 1'8"    | 1'3"    |
| 25 ft.                               | NEAR | 9'7"  | 9'2"  | 7'4"  | TO INF. | TO INF. | TO INF. | TO INF. | TO INF. | TO INF. |
|                                      | FAR  | Inf.  | Inf.  | Inf.  | ↓       | ↓       | ↓       | ↓       | ↓       | ↓       |
| UNIVERSAL<br>20 ft.<br>FOCUS SETTING | NEAR | 8'9"  | 8'5"  | 6'10" | 5'4"    | 4'2"    | 3'1"    | 2'4"    | 1'8"    | 1'3"    |
|                                      | FAR  | Inf.  | Inf.  | Inf.  | Inf.    | Inf.    | Inf.    | Inf.    | Inf.    | Inf.    |
| 15 ft.                               | NEAR | 7'7"  | 7'5"  | 6'2"  | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       |
|                                      | FAR  | 365'  | Inf.  | Inf.  | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       |
| 14 ft.                               | NEAR | 7'5"  | 7'2"  | 6'    | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       |
|                                      | FAR  | 136'  | 364'  | Inf.  | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       |
| 13 ft.                               | NEAR | 7'1"  | 6'10" | 5'9"  | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       |
|                                      | FAR  | 78'   | 121'  | Inf.  | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       |
| 12 ft.                               | NEAR | 6'9"  | 6'7"  | 5'7"  | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       |
|                                      | FAR  | 52'   | 68'   | Inf.  | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       |
| 11 ft.                               | NEAR | 6'6"  | 6'3"  | 5'4"  | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       |
|                                      | FAR  | 37'   | 45'   | Inf.  | ↑       | ↑       | ↑       | ↑       | ↑       | ↑       |
| 10 ft.                               | NEAR | 6'1"  | 5'11" | 5'1"  | 4'3"    | ↑       | ↑       | ↑       | ↑       | ↑       |
|                                      | FAR  | 28'   | 32'   | Inf.  | Inf.    | ↑       | ↑       | ↑       | ↑       | ↑       |
| 9 ft.                                | NEAR | 5'9"  | 5'7"  | 4'10" | 4'      | ↑       | ↑       | ↑       | ↑       | ↑       |
|                                      | FAR  | 21'   | 23'   | 66'   | Inf.    | ↑       | ↑       | ↑       | ↑       | ↑       |
| 8 ft.                                | NEAR | 5'4"  | 5'1"  | 4'6"  | 3'10"   | ↑       | ↑       | ↑       | ↑       | ↑       |
|                                      | FAR  | 16'   | 18'   | 35'   | Inf.    | ↑       | ↑       | ↑       | ↑       | ↑       |
| 7 ft.                                | NEAR | 4'10" | 4'9"  | 4'2"  | 3'7"    | ↑       | ↑       | ↑       | ↑       | ↑       |
|                                      | FAR  | 13'   | 14'   | 21'   | 182'    | ↑       | ↑       | ↑       | ↑       | ↑       |
| 6 ft.                                | NEAR | 4'4"  | 4'3"  | 3'10" | 3'4"    | ↑       | ↑       | ↑       | ↑       | ↑       |
|                                      | FAR  | 9'9"  | 10'   | 14'2" | 34'2"   | ↑       | ↑       | ↑       | ↑       | ↑       |



# DEPTH OF FIELD — 27mm TELEPHOTO

| Lens Opening                         |      | 1.8   | 2     | 2.8   | 4    | 5.6   | 8     | 11    | 16    | 22                         |
|--------------------------------------|------|-------|-------|-------|------|-------|-------|-------|-------|----------------------------|
| Object Distance                      |      |       |       |       |      |       |       |       |       |                            |
| 50 ft.                               | NEAR | 29'   | 28'   | 24'   | 19'  | 16'   | 12'   | 9'    | 6'10" | 4'8"<br>↑<br>TO INF.<br>↓  |
|                                      | FAR  | 190'  | 237'  | Inf.  | Inf. | Inf.  | Inf.  | Inf.  | Inf.  |                            |
| 25 ft.                               | NEAR | 18'   | 18'   | 16'   | 14'  | 13'   | 9'8"  | 8'    | 6'    | 4'5"<br>↑<br>TO INF.<br>↓  |
|                                      | FAR  | 40'   | 41'   | 56'   | 118' | Inf.  | Inf.  | Inf.  | Inf.  |                            |
| UNIVERSAL<br>20 ft.<br>FOCUS SETTING | NEAR | 15'   | 15'   | 14'   | 12'  | 11'   | 8'9"  | 7'    | 5'8"  | 4'5"<br>↑<br>TO INF.<br>↓  |
|                                      | FAR  | 28'   | 29'   | 36'   | 55'  | 188'  | Inf.  | Inf.  | Inf.  |                            |
| 15 ft.                               | NEAR | 12'   | 12'   | 11'   | 10'  | 9'    | 7'8"  | 7'    | 5'2"  | 3'11"<br>↑<br>TO INF.<br>↓ |
|                                      | FAR  | 19'   | 20'   | 23'   | 29'  | 45'   | 315'  | Inf.  | Inf.  |                            |
| 14 ft.                               | NEAR | 12'   | 11'   | 11'   | 10'  | 9'    | 7'5"  | 6'    | 5'    | 3'11"<br>↑<br>TO INF.<br>↓ |
|                                      | FAR  | 18'   | 18'   | 20'   | 25'  | 38'   | 134'  | Inf.  | Inf.  |                            |
| 13 ft.                               | NEAR | 11'   | 11'   | 10'   | 9'   | 8'    | 7'1"  | 6'    | 4'11" | 3'11"<br>↑<br>TO INF.<br>↓ |
|                                      | FAR  | 16'   | 16'   | 18'   | 22'  | 31'   | 78'   | Inf.  | Inf.  |                            |
| 12 ft.                               | NEAR | 10'   | 10'   | 9'6"  | 9'   | 8'    | 6'9"  | 6'    | 4'9"  | 3'11"<br>↑<br>TO INF.<br>↓ |
|                                      | FAR  | 15'   | 15'   | 16'   | 20'  | 26'   | 52'   | Inf.  | Inf.  |                            |
| 11 ft.                               | NEAR | 9'6"  | 9'4"  | 8'10" | 8'   | 7'    | 6'6"  | 5'7"  | 4'7"  | 3'11"<br>↑<br>TO INF.<br>↓ |
|                                      | FAR  | 13'   | 13'   | 15'   | 17'  | 22'   | 29'   | 313'  | Inf.  |                            |
| 10 ft.                               | NEAR | 9'    | 8'7"  | 8'    | 7'7" | 7'    | 6'1"  | 5'4"  | 4'5"  | 3'4"<br>↑<br>TO INF.<br>↓  |
|                                      | FAR  | 12'   | 12'   | 13'   | 16'  | 18'   | 27'   | 85'   | Inf.  |                            |
| 9 ft.                                | NEAR | 7'11" | 7'10" | 7'6"  | 7'   | 6'5"  | 5'9"  | 5'    | 4'2"  | 3'4"<br>↑<br>TO INF.<br>↓  |
|                                      | FAR  | 10'5" | 10'6" | 11'   | 13'  | 15'   | 21'   | 43'   | Inf.  |                            |
| 8 ft.                                | NEAR | 7'2"  | 7'1"  | 6'10" | 6'5" | 5'11" | 5'4"  | 4'8"  | 4'    | 3'4"<br>↑<br>TO INF.<br>↓  |
|                                      | FAR  | 9'1"  | 9'3"  | 9'9"  | 11'  | 12'   | 16'   | 27'   | Inf.  |                            |
| 7 ft.                                | NEAR | 6'4"  | 6'3"  | 6'1"  | 5'9" | 5'4"  | 4'10" | 4'4"  | 3'8"  | 3'4"<br>↑<br>TO INF.<br>↓  |
|                                      | FAR  | 7'10" | 7'11" | 8'4"  | 9'   | 10'   | 13'   | 18'   | 67'   |                            |
| 6 ft.                                | NEAR | 5'6"  | 5'6"  | 5'4"  | 5'1" | 4'9"  | 4'4"  | 3'11" | 3'5"  | 3'4"<br>↑<br>TO INF.<br>↓  |
|                                      | FAR  | 6'7"  | 6'8"  | 6'11" | 7'5" | 8'2"  | 9'9"  | 13'   | 25'   |                            |



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PURCHASED FROM \_\_\_\_\_  
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MODEL NO. \_\_\_\_\_ SERIAL NO. \_\_\_\_\_

PURCHASED FROM \_\_\_\_\_ DATE \_\_\_\_\_

ADDRESS \_\_\_\_\_ CITY \_\_\_\_\_ STATE \_\_\_\_\_

LENS INFORMATION \_\_\_\_\_

1. \_\_\_\_\_ Serial No. \_\_\_\_\_

2. \_\_\_\_\_ Serial No. \_\_\_\_\_

3. \_\_\_\_\_ Serial No. \_\_\_\_\_



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